

Global Command and Control System (GCCS) and Strategic Education at the U.S. Army War College

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Abstract

The art and science of command and control is readily definable, yet imparting the "how", particularly at the strategic and national level, tends to prove difficult. This is why enabling tools, like the Global Command and Control System (GCCS) are an important element for not only actual operations, but also within the Joint Professional Military Educational (JPME) system. The U.S. Army War College (USAWC) was the first senior service college to have and incorporate GCCS into its curriculum. How GCCS came to USAWC was a matter of forward looking vision, good planning and coincidence. This paper will cover events that led to employment of GCCS at Carlisle Barracks, how the system is being used as an integral element of command and control education, including the capstone exercise, the Strategic Crisis Exercise (SCE) and will conclude with a view toward the future technological impact of emerging systems on USAWC education.

1. Introduction to GCCS

The Department of Defense's Joint Staff, recognizing command and control deficiencies during Operation Desert Storm, pushed the ongoing transition efforts away from the Top Secret, Worldwide Military Command and Control System (WWMCCS) mainframe architecture. The goal was to develop a user-friendly client-server, distributed system available at the secret level. Fundamentally, GCCS is designed to meet the command and control automation needs of the Joint Staff, Commanders-in-Chief and designated Joint Task Force Commands for distributed, collaborative deliberate and crisis action planning as well as access to strategic data bases and homepages. GCCS was developed maximizing the use of industry standard commercial-off-the-shelf software and "best of the breed" existing government developed software.

2. U.S. Army War College in a Nutshell

"Not to promote war but to preserve peace by intelligent and adequate preparation to repel aggression... to study and confer on the great problems of national defense..."

-Elihu Root, 1903

The mission of the U.S. Army War College (USAWC) is to prepare selected military (Lieutenant Colonels and Colonels), civilian and international leaders to assume strategic leadership responsibilities in military and national security organizations; to educate students about the

Report Documentation Page			Form Approved OMB No. 0704-0188					
<p>Public reporting burden for the collection of information is estimated to average 1 hour per response, including the time for reviewing instructions, searching existing data sources, gathering and maintaining the data needed, and completing and reviewing the collection of information. Send comments regarding this burden estimate or any other aspect of this collection of information, including suggestions for reducing this burden, to Washington Headquarters Services, Directorate for Information Operations and Reports, 1215 Jefferson Davis Highway, Suite 1204, Arlington VA 22202-4302. Respondents should be aware that notwithstanding any other provision of law, no person shall be subject to a penalty for failing to comply with a collection of information if it does not display a currently valid OMB control number.</p>								
1. REPORT DATE 1999	2. REPORT TYPE	3. DATES COVERED 00-00-1999 to 00-00-1999						
4. TITLE AND SUBTITLE Global Command and Control System (GCCS) and Strategic Education at the U.S. Army War College			5a. CONTRACT NUMBER					
			5b. GRANT NUMBER					
			5c. PROGRAM ELEMENT NUMBER					
6. AUTHOR(S)			5d. PROJECT NUMBER					
			5e. TASK NUMBER					
			5f. WORK UNIT NUMBER					
7. PERFORMING ORGANIZATION NAME(S) AND ADDRESS(ES) Army War College, Center for Strategic Leadership, Command and Control Group, Carlisle Barracks, PA, 17013			8. PERFORMING ORGANIZATION REPORT NUMBER					
9. SPONSORING/MONITORING AGENCY NAME(S) AND ADDRESS(ES)			10. SPONSOR/MONITOR'S ACRONYM(S)					
			11. SPONSOR/MONITOR'S REPORT NUMBER(S)					
12. DISTRIBUTION/AVAILABILITY STATEMENT Approved for public release; distribution unlimited								
13. SUPPLEMENTARY NOTES 1999 Command and Control Research and Technology Symposium								
14. ABSTRACT								
15. SUBJECT TERMS								
16. SECURITY CLASSIFICATION OF: <table border="1"> <tr> <td>a. REPORT unclassified</td> <td>b. ABSTRACT unclassified</td> <td>c. THIS PAGE unclassified</td> </tr> </table>			a. REPORT unclassified	b. ABSTRACT unclassified	c. THIS PAGE unclassified	17. LIMITATION OF ABSTRACT	18. NUMBER OF PAGES 9	19a. NAME OF RESPONSIBLE PERSON
a. REPORT unclassified	b. ABSTRACT unclassified	c. THIS PAGE unclassified						

employment of landpower as part of unified, joint or multinational force in support of national military strategy; to research operational and strategic issues and conduct outreach programs that benefit USAWC, the U.S. Army and the nation.

The composition of a typical war college class consists of approximately 320 total students, of which 199 are Army officers, 26 Air Force, 10 Marine, 14 Navy, 1 Coast Guard, 29 Civilians and 40 International Fellows. Of these, approximately 15 percent belong to the reserve forces or National Guard.

3. USAWC Joins the Operational WWMCCS Network

On 4 April 1994 the US Army War College (USAWC) embarked on a new era of active participation in the World Wide Military Command and Control System (WWMCCS). Two Honeywell mainframe systems began direct on-line support to the US Army Europe and Headquarters Seventh US Army (HQUSAREUR) in Heidelberg, Germany.

This direct connection from Carlisle Barracks, Pennsylvania, to the Commander-in-Chief, US Army Europe (CINCUSAREUR) came after months of careful planning involving the Joint Staff (J6), Headquarters Department of The Army (HQDA), Deputy Chief of Staff for Operations (ODCSOPS), HQUSAREUR and the USAWC. Authorization to relocate WWMCCS equipment and personnel supporting HQUSAREUR from Baumholder, Germany to USAWC is contained in System Development Notice, dated 9 July 1993, and by The Joint Staff in October 1993.

The genesis of this relocation began in 1990 as a result of a HQ European Command (HQEUCOM) study examining the feasibility of consolidating the four existing WWMCCS sites to one. This action was taken concurrently with a Joint Staff initiative to consolidate WWMCCS facilities worldwide. These initiatives came as a result of a desire to reduce command and control overhead as part of the on-going Department of Defense, Defense Management Reviews (DMR).

In January 1993, CINCUSAREUR recommended relocation of the USAREUR WWMCCS to US Army War College. This was followed by USAWC acceptance of the proposal to relocate USAERUR WWMCCS operations to the USAWC Collins Hall. Coincident with the relocation of WWMCCS was the construction of Collins Hall, the US Army Center for Strategic Leadership (CSL), designed as a high technology multi-level secure facility into which the TOP Secret WWMCCS could easily be installed and operated. To provide direct on-site assistance the HQUSAREUR, the USAWC had a team located at Campbell Barracks, Heidelberg GE, known as the USAREUR Support Group.

4. Advent of the Global Command and Control System

While HQUSAREUR and USAWC were concentrating on relocating the WWMCCS to Carlisle Barracks, the Joint Staff was developing the concept of Command, Control, Communications, Computers and Intelligence (C4I) for the Warrior (C4IFTW), the doctrinal foundation concept of the Global Command and Control System (GCCS). Therefore, subsequent to achieving operational support to CINCUSAREUR work began to transition from WWMCCS to GCCS. Since GCCS is a client-server based system the implementation of GCCS did not mirror the

WWMCCS network and site locations. The Defense Information Systems Agency (DISA) determined that CINCUSAREUR could have a GCCS node connected to the EUCOM GCCS. This site was established in Collins Hall using the in-place Support Group facility and staff. The WWMCCS support to CINCUSAREUR was terminated and the WWMCCS hardware was given to the Veterans Administration for reuse. GCCS was fully installed and became operationally available to the USAWC in March 1996.

5. Transition to Strategic Education

The operational command and control environment brought the USAWC a new opportunity to provide the students, faculty and staff real-world operational connectivity with major joint theater commands. When WWMCCS downgraded from Top Secret to Secret and further evolved into the GCCS the stage was set for greatly expanding the opportunity for allowing students to have direct access to GCCS modules.

For the first time students could now apply theory into practice using the automated tools that would be waiting for them at their next assignments. This was a unique organizational structure within the JPME community. No other senior level academic organization provided students with direct access to current command and control systems.

The Commandant, USAWC recognized that 21st century warfare would demand educated, skilled, competent, and confident leaders capable of applying and leveraging information technology tools. To ensure graduates could meet these demands of future warfare, a revision to core and advanced (elective) curriculum was initiated. A feasibility study designed to identify a set of strategic command and control requirements was conducted and forwarded to Headquarters, Department of the Army, Deputy Chief of Staff for Operations with the understanding USAWC would integrate GCCS into the academic curriculum.

This study and resulting implementation has helped the War College to reach for the Commandant's vision for USAWC to be the preeminent center for strategic leadership and landpower. Through the integration of GCCS and other automated systems, the U.S. Army War College does much to prepare leaders for tomorrow's challenges by pursuing the mastery of strategic art through education, research and outreach.

6. GCCS Integration into USAWC Curriculum

The concept of the "Fourth Army War College" as announced by the Commandant, US Army War College, sets forth both a vision and a challenge to prepare Army leaders for current and future command integrating strategic information systems in a seamless educational experience. This challenge is being met by the college through inclusion of GCCS applications in a wide variety of course offerings, special experiential learning sessions and embedding the GCCS applications into the curriculum capstone Strategic Crisis Exercise (SCE).

An underlying precept of this educational experience is to join strategic thinking to the strategic command and control system acquainting USAWC students with the overall strengths and capability of GCCS including distributed collaborative planning.

The USAWC Academic Board approved four initiatives concerning the integration of GCCS into the college curriculum. The GCCS goal as stated is "[p]rovide GCCS functionality to all seminars and for GCCS to act as the basic command and control system for SCE". Exercise models provide students opportunities to confront the intricacies of integrated Command and Control systems in a "learning" environment. Using systems similar to those resident at the Joint Staff and joint operational headquarters, students become familiar with applications, their integration, and the interpretation of displayed data, including its manipulation within the system.

The focal point for GCCS education at USAWC is the Center for Strategic Leadership (CSL), located at Collins Hall on Carlisle Barracks. Within CSL the Command and Control Group (C2G), part of the Science and Technology Division, provides a broad based educational experience for USAWC students by incorporating the Joint Staff's Joint Vision 2010 (JV2010) into the GCCS curriculum. Linking specific GCCS components to the principles of JV2010 underscores the relationship between overarching national strategy and the implementing command and control systems enabling that strategy to be fulfilled. The C2G has established an experiential learning center consisting of a number of systems with connectivity to GCCS that USAWC students access either as part of a formal course of study or on-demand. Technical staff members are available to assist students on a one-on-one basis.

6.1 GCCS Programs

The integration of GCCS into the college's curriculum is conducted at several levels. USAWC GCCS educational opportunities include a robust complementary studies program, noontime lectures, advanced courses (electives), and computer-based tutorials functioning as cornerstone tools in several gaming exercises. In addition, courses are created and designed to meet the requirements of individual students.

6.2 Complementary Studies Program

The Complementary Studies Program (CSP) is a three-layered series of classes designed to provide the full spectrum of GCCS education, from overview to hands-on. The program consists of system overviews, functional specific courses, and in-depth, application-specific education that provides hands-on training. Students attend classes either to prepare for formal war college classes that use GCCS or for preparation for their follow-on assignments.

There are two introductory courses: one focuses on the current systems and how they relate to the planning process, and a second that looks at the JV2010 framework and follow-on and emerging systems that will affect planning and operations in the next 10 years. These courses are seminar in nature, with student interaction sometimes leading the direction of the course. Both courses provide an overview of the capabilities of the systems while focusing on the planning and execution portions of military operations. As its name would indicate the JV2010 course looks at emerging systems and doctrine in the area of Command and Control Warfare.

The functionally specific courses focus on those systems that would fit the requirements of specific functional area, as in operations/plans, intelligence, logistics and transportation. For

example, the logistic course examines GCCS applications related to Time Phased Force Deployment Data (TPFDD) development and implementation, as well as feasibility analysis and sustainment. Systems such as Requirements Development and Analysis (RDA), Joint Flow Analysis System for Transportation (JFAST), Logistics Sustainment Analysis Feasibility Estimator (LOGSAFE), and other systems related to engineering and medical, as well as personnel systems are presented in detail. The students are provided the opportunity to view the live systems and how they interact, as well as how they fit into the planning process.

Finally, in the application specific arena, students are provided the opportunity to use the systems as they would be used at a Theater CINC or other national level organization. In-depth tutorials and one-on-one sessions with subject matter experts are available for those students that desire this level of detail. These classes are specific to a single application and make use of the theory from previous classes and introduce “buttonology”. Buttonology is the actual pressing of keys and mouse clicks to derive information from the system. While hands-on classes are more tactile (training) than theory (education), they do provide the student with a fair degree of mastery, which is required to truly employ GCCS to its full potential.

6.3 Noontime seminars

Another opportunity provided to students for exposure to the GCCS system is the noontime lecture series. These are a series of overview lectures provided for both the resident and Distance Education students during their two-week resident phase. These lectures serve a two-fold purpose, first to provide students and faculty a broad brush overview of GCCS and also to provide exposure to the other GCCS related educational opportunities.

6.4 Advanced Courses

The college offers several advanced courses, both in the resident and Distance Education curriculums which provide exposure to GCCS in varying degrees. This exposure ranges from a course devoted solely to GCCS to others that employ GCCS capabilities during practical exercises which assume some previous experience with GCCS.

The Modern Aids for Planning course, known as MAP, focuses on application and research of GCCS functionality. Students receive seven hours of lecture information, then are assigned a specific system in GCCS for in-depth research. In the subsequent six course periods, students present their research and lead a practical exercise they developed for their specific application. This course provides an ideal environment for student's to realize both the power and limitations of each application and the system as a whole.

Two similar advanced courses, the Joint Crisis Action Planning and the Strategic Crisis Action Planning also provide students opportunities to use the GCCS systems capabilities. Students work through the different phases of the Crisis Action Planning model and use the GCCS applications that correspond for each phase. For example, during phase one, students use Intelink to discern the current situation, and in subsequent phases other GCCS applications that enable rapid and current products are introduced.

The Joint Land, Aerospace, Sea Simulation or JЛАSS is a multiple school, advanced planning scenario that ultimately leads to an interactive student wargame at Maxwell AFB. This exercise and wargame moves students rapidly through the Crisis Action Planning process, using a North West Asia scenario. Students participate as decision-makers and planners at the Unified Forces, service components and task force commanders. This planning scenario lends itself very well to the use of Distributed Collaborative Planning tools in GCCS, with the associated connectivity to distant locations for the planning process. During the planning process students have opportunity to communicate with the other schools using the Video Teleconferencing capabilities of Theater Analysis Re-planning Graphical Execution Toolkit (TARGET). Because of the inter-school aspect of JЛАSS, GCCS receives exposure and use at the other service's war college. To ensure that all service colleges were ready to use GCCS applications, CSL deployed a mobile training team that traveled to each of the war colleges and conducted training and installation of specific GCCS applications that would be used in JЛАSS.

6.5 Computer Based Tutorials

In order provide an on demand, any-time educational outreach, CSL designed and developed a series of on-line computer based tutorials. Paralleling the Complementary Studies Model, these tutorials have three levels. The overview courses are unclassified and are available from the post's Intranet server. The functional and application specific courses, while not specifically classified, are sensitive in nature and are therefore only available on the classified network. Ideally, student's progress sequentially through the series of courses, gaining the broad overview, followed by the function integration of each tool and finishing with the how-to application specific courses. Student progress is automatically tracked by log-on and module completion actions.

In addition to these general GCCS tutorials, all students and faculty have access to computer tutorials designed for specific exercise. These tutorials are streamlined and tailored the particular applications and functions that will be employed during that exercise. The tutorials are available on-line making exercise preparation and training convenient for students and accessible to participants at outside locations.

6.6 GCCS in Gaming and Exercises - the Strategic Crisis Exercise

A central mission of Center for Strategic Leadership is to develop and host the capstone exercise for USAWC. The annual Strategic Crisis Exercise, or SCE, creates a realistic strategic environment for students in the areas of Joint and Combined Crisis Action Planning. This ten day, multiple scenario, multi-world exercise employs a wide variety of automated tools and databases.

It is here the power, versatility and capability of GCCS shine. However, to make GCCS fit into the unique nature and purpose of USAWC strategic gaming exercise, several adaptations were required for both applications and data. There were four significant aspects of GCCS that required modification to fulfill the USAWC strategic gaming requirement. There are: the need for multiple (data sets) worlds, the need to generate game specific data, the large number of concurrent users and the need to streamline capabilities.

Because of the number of students and the need for each student to have the opportunity to serve in a significant leadership role, two or more simulations are run concurrently. After the first day, each world's scenario diverges. This requires GCCS to store and display separate data sets for each world. To accomplish this two parallel database servers were configured. This allowed each world to see only the data specific to that world's scenario.

For a variety of reasons, most USAWC games are set in a future scenario. This requires generation of data representing future units with future capabilities. All friendly, enemy and neutral units and entities database, including location, readiness status, affiliation, etc, are produced locally. In general terms, the game controllers scripted the unit information into Access databases or spreadsheets and then passed the data to C2G personnel. The GCCS database managers then converted the data into Over-the-Horizon (OTH) Gold messages for updating Command and Control PC and into an Oracle database for GSORTS.

At any one time, GCCS data may be accessed by up to thirty or more users via a PC x-terminal window. To handle this load, application servers were upgraded. With the upgraded servers, no significant degradation was encountered.

The entire GCCS suite provides a large number of applications, far more than needed or can be effectively used by USAWC students. To ensure students are not overwhelmed, the number of available applications is pared down to a reasonable level. Once the number of applications has been narrowed down, only the needed functions of these remaining programs are enabled and used. This provides the students with sufficient information, ensuring the forest would not be lost to the trees.

7. Current System Architecture at USAWC

The configuration of GCCS at USAWC was designed with flexibility in mind. The requirement to reconfigure frequently to meet the various educational and exercise needs was the prime consideration. The standard configuration includes a dedicated classroom, server system, GCCS computer laboratory, secure local area network within the facility, Secure Internet Protocol Router Network (SIPRNET) connectivity and a GCCS desktop video conferencing room.

8. Future

"Educate Strategic Leaders for the 21st century"
-LTG Chilcoat, former Commandant, USAWC

As the US Army War College evolves into the "Fourth" war college envisioned by the former commandant, LTG Chilcoat, institutional change is required. Assimilation of the GCCS into the total curriculum is essential. When embedded into the curriculum, these systems will provide a foundation for extensive renovation of the overall college strategic educational experience. Joint doctrine requires synchronized operations involving all elements of military power, including command and control systems. In order to coordinate effectively all the elements of strategic power, USAWC students must be able to experience, in a benign environment, the impact of using the GCCS.

Incorporating these systems into the core curriculum as integral components of seminar discussion, practical exercise and advanced research will instill a realization that automated command and control systems are powerful tools for joint operations. Just as the corporate world has changed focus to the leveraging of information for success, the Army, through systems like GCCS can quickly do the same.

Distributed collaborative planning, a cornerstone of information warfare technology, enabled through current, e.g., TARGET and future GCCS applications, e.g., Common Operational Modeling, Planning and Simulation Strategy (COMPASS) can become a fundamental building block for college curriculum extending to other senior service colleges, universities and governmental agencies. Through the use of GCCS applications and distributed planning tools, the idea of a "virtual campus" becomes a reality.

Already, in JЛАSS all senior service colleges were connected using TARGET's distributed planning and VTC capability. In the SCE, GCCS capability has been used successfully to link the war fighting CINC planners from each unified command with USAWC student. This same concept can be extended, encompassing the USAWC (including the Center for Strategic Leadership, Peacekeeping Institute, Military History Institute, Institute for Strategic Studies), the National Defense University, Armed Forces Staff College, US Navy War College, USAF War College, other governmental agencies such as State Department, Federal Emergency Management Agency, Drug Enforcement Agency, US Customs Department, Immigration and Naturalization Service, Library of Congress and non-governmental organizations (NGOs) agencies such as civilian colleges and universities having significant Department of Defense related curriculums/programs/institutes.

The synergism achieved from such an overarching network provides students, staff and faculty at these various institutions, access to distributed seminars, and exercises paralleling real-world distributive collaboration. Encapsulated in this concept is access to the service's and joint simulation centers, using the Distributed Collaborative Planning, Modeling & Simulation (DCPM&S) provided by the new GCCS application, COMPASS thereby providing students the ability to manipulate on-line simulations in conjunction with exercises and seminars.

As a companion effort the USAWC in conjunction with the Defense Information Systems Agency (DISA) could become a beta test site for modification of GCCS modules. DISA personnel and contractor support staff could hold seminars with USAWC students designed to elicit lessons learned from student's experiences using these systems. Seminars offer opportunities for input to DISA for recommended improvements to fielded systems or development of new systems. An advanced course could be developed, in conjunction with DISA, involving select students, based on their previous military/civilian experience, to focus on C4I systems resulting in papers and research directly affecting future releases of such systems. The objective is to use the experiences and ideas of the select group of officers and senior civilians to provide direct input to the system designers and developers to achieve increased relativity to users. As the operational environment changes, new requirements, functionality and capabilities are identified that could be inserted into future releases through these seminars/courses. If we agree USAWC students are the future strategic leaders of the Army, and possibly the nation's or multi-national military establishment, then we should not miss the

opportunity to engage these individuals in meaningful dialogue concerning information systems based command and control systems.

9. Conclusion

The curriculum, the educational process and ultimately the war college graduates have benefited from the inclusion of GCCS. Allowing students to use, manipulate and learn from the actual command and control system in this educational environment has enhanced realism and is producing graduates who are readily familiar with the “tools-of-the-trade” upon their arrival at their next duty station. GCCS both in its current configuration and the expectant upgrades has truly added value to USAWC command and control education.

While the presence of GCCS at USAWC was the result of good fortune, its inclusion within the curriculum and employment as command and control tool of choice for exercises was the consequence of good planning and visionary leadership. As GCCS and information technology as a whole geometrically increase in capability and power, the same planning and leadership that brought GCCS originally into the USAWC fold must also incorporate and leverage these changes.